Early Melanoma Detection: What is the Role of the Advanced Practice Nurse?
D Chinni, J Schwartz, L Keilman, T Johnson

Abstract

INTRODUCTION
Cutaneous melanoma is a type of skin cancer that may have devastating effects. The incidence is rising faster than any other type of cancer increasing 121% from 1973 to 1994. In the United States (U.S.), one in 1500 persons born in 1935 are estimated to develop melanoma in their lifetime compared to 1 in 250 persons born in 1980. It is projected that 1 in 50 persons born in 2010 will develop melanoma during their lifetime. Melanoma occurs in a younger age group than many cancers and the mortality rate is second only to lung cancer. Melanoma is second only to leukemia among adult- onset cancers in average years of potential life lost and years of income lost due to cancer-related death in the U.S. In the U.S., melanoma is the most common type of cancer in women aged 25-29, and second only to breast cancer in women aged 30-34. Melanoma is the most common type of cancer in Caucasian men in Michigan ages 25-44. One person dies of melanoma approximately every hour in the U.S. The morbidity and mortality from melanoma may be reduced by screening and secondary prevention efforts aimed at high risk individuals.

The prognosis for persons with melanoma varies considerably. Melanoma in situ is theoretically 100% curable while advanced metastatic melanoma is nearly universally fatal. A favorable prognosis is dependent on early diagnosis and correct treatment. Primary care practitioners (PCPs) should play a significant role in early melanoma detection. Since most people enter the health care system at the primary care level, primary care practitioners see a large proportion of the population. This is an ideal opportunity for early melanoma detection and education.

There are no studies on the role of primary care advanced practice nurses (PCAPNs) in melanoma recognition and education. There is evidence, however, that a significant percentage of PCPs may lack the knowledge, skill, and/or confidence necessary to appropriately diagnose, assess, educate, and refer patients with melanoma. Therefore, it is probable that a significant proportion of PCAPNs may also lack these abilities. PCAPNs should be knowledgeable about risk factors and early signs and symptoms of cutaneous melanoma to allow them to integrate a brief focused history and physical examination for melanoma into the context of any primary care visit. This has the potential for screening a large population for melanoma and educating them on the risk factors for and the signs and symptoms of melanoma. Many lives may be saved with huge cost savings to the health care system with early detection of this potentially fatal skin cancer.

The objective of this manuscript is to provide the PCAPN with the necessary basic education for melanoma detection that can be incorporated into the context of any primary care visit including identification of high risk populations, the early signs and symptoms of melanoma, and initial diagnostic management.

DEFINITION
Melanoma arises from the melanocyte in the skin usually located at the dermal-epidermal junction (DEJ). Melanoma initially grows radially at the DEJ and when confined to this location is called melanoma in situ. With time, these cells invade vertically into the dermis. Once invasion occurs, melanoma can metastasize to the regional lymph nodes, and/or to other distant visceral organ systems in the body via the lymphatic or vascular systems. The deeper melanoma invades, the greater the risk for metastasis, usually first through the lymphatics followed by the bloodstream. Late detected, deep lesions usually metastasize to the visceral...
Early Melanoma Detection: What is the Role of the Advanced Practice Nurse?

MELANOMA TRENDS
An alarming rise in the number of melanoma cases continues to occur at approximately 4% per year. (1,3) Approximately 51,400 new cases of invasive melanoma and 20-40,000 cases of melanoma in situ were estimated to be diagnosed in the year 2001. (4) The incidence has more than tripled in Caucasians since 1980 to present. The mortality rate for melanoma is also rising by approximately 2% each year. Between 1973 to 1994, the overall mortality rate increased by 39%, 47% for males, 21% for females. (3) The 5-year survival rate for melanoma was 50% in 1954 and rose to approximately 80% in 1990s, largely a reflection of earlier detection. (2,3,4,7) This improved survival rate, however, plateaued during the past decade suggesting the need for new screening and educational programs.(4) Furthermore, the annual direct cost of treating melanoma in 1997 was estimated at $563 million with projections exceeding $5 billion by 2010 for Medicare alone. (2,15,16) Approximately 90% of this cost is attributable to less than 20% of patients. These are the patients with late detected or metastatic disease, again highlighting the critical importance of early detection, diagnosis, and treatment.(15)

ETIOLOGY AND RISK FACTORS
There are both genetic and environmental factors involved in the development of melanoma. (2,4,17,18,19,20) The most significant environmental cause is excessive sun exposure, particularly acute intermittent episodes resulting in peeling or blistering sunburns, even only a few, occurring in the first 18 years of life.(1,19,20) Additionally, data suggests a potential causative role of light used in tanning beds/sunlamps in the pathogenesis of melanoma and over 25 million Americans use these devices. (20, 21, 22, 23) While ultraviolet light particularly from the sun plays a causative role in approximately 70% of melanomas, not all melanomas are sun-related and much is yet to be learned regarding other causative factors.

SIGNS AND SYMPTOMS
Melanoma may arise within a preexisting nevus or on clinically appearing normal appearing skin with close to equal frequency. The earliest sign of a melanoma is a change in the size, shape, or color of a lesion. The earliest symptom is persistent itching in a lesion. Late signs include ulceration, bleeding, and/or tenderness and are associated with deeper melanoma.(26,27) Other classic signs (ABCDs) of lesions which should be suspect are those that are asymmetrical (A), have irregular borders (B), are black or have shades of blue, red, or white color (C), and those which are larger than 6 millimeters in diameter (D). But, early melanomas often lack these classic ABCD features. Therefore, any changing pigmented lesion or a new atypical skin lesion should be evaluated with consideration for biopsy, especially in a patient with risk factors for melanoma.

Melanoma can arise anywhere on the skin but is most common on the trunk in men and the trunk and lower extremities in women (4). While rare in darker skin types, melanoma most commonly occurs on the soles of the feet in the African-American population.(25) Melanoma may also rarely occur in mucosal, genital, nailbed, and ocular sites. Figures 1-7 demonstrate clinical features.

Persons with certain phenotypic characteristics are at increased risk for developing melanoma including those with blue or green eyes, fair skin, and blonde or red hair (1). A person with more than 50 clinically normal appearing nevi in childhood or greater than 100 clinically normal appearing nevi in adulthood is at higher risk. Persons with atypical (dysplastic) nevi, even one, are also considered to be at higher risk and these individuals are also at increased risk of developing melanoma in sun protected sites.(1) Those with a prior personal history or a family history of melanoma are at increased risk. Approximately 5-10% of people with one melanoma develop additional primary melanomas (multiple primaries) which may occur several decades after the first melanoma. (6,7) Rarely, people with deeper skin develop melanoma and unfortunately are more likely to die because of late detection. (8,9) With knowledge of these risk factors, the PCAPN can easily identify populations at increased risk for melanoma, examine their skin, and educate them about self-skin examination and prevention measures.
**Figure 1**
Figure 1: Advanced melanoma with classic ABCD features.

**Figure 2**
Figure 2: Classic melanoma with ABCD features.

**Figure 3**
Figure 3: Early melanoma on the cheek. The patient noted a change in shape and size.

**Figure 4**
Figure 4: Early melanoma on the thigh in a 28-year-old, tan woman with a history of tanning booth use. The decision to biopsy was based primarily on a history of darkening color. Note lack of ABCDs in early lesion. Key is “change.”
Early Melanoma Detection: What is the Role of the Advanced Practice Nurse?

Figure 5
Figure 5: Melanoma with ABCDs located on the posterior ear- noted by his barber.

Figure 6
Figure 6: Melanoma located on the perianal-buttock skin.

Figure 7
Figure 7: Subungal melanoma on the great toe. Figures 5, 6, and 7 highlight the need for complete skin examination.

BIOPSY

Any suspicious lesion needs a biopsy. If the lesion is small, complete excision with narrow (1-2 mm) margins is preferred to provide the dermatopathologist with the entire lesion for histologic evaluation. If the lesion is too large to completely excise or in a surgically difficult location for example the face, hands, or feet, an incisional biopsy is acceptable. Incisional biopsies do not increase the risk of metastasis nor decrease survival. However, if the diagnosis of melanoma is not confirmed by an incisional biopsy within a suspicious melanocytic lesion, complete excision is still required due to the possibility of a sampling error.\(^\text{[6,28]}\)

Regardless of the type of biopsy that is performed the biopsy should be deep enough to avoid transecting the lesion at the deep margin. This is critical because the most important prognostic factor, tumor thickness, cannot be accurately determined if the biopsy transects the lesion at the deep margin. Therefore, any biopsy should extend to or close to the underlying adipose tissue. Frozen sections and fine needle aspiration (FNA) have no role in diagnosis of primary cutaneous melanoma. FNA for palpable nodules in the nodal basin or soft tissues is usually reliable for the diagnosis of metastatic disease.\(^\text{[29]}\)

The biopsy specimen must be evaluated by a dermatopathologist with experience in melanocytic skin lesions. As many as 15-20% of patients referred to a large
multidisciplinary melanoma clinic have significant alterations in diagnosis based on discordant histopathologic findings leading to a change in work-up, treatment or prognosis. (16) Once a diagnosis of melanoma is confirmed, referral to a multidisciplinary melanoma center for consultation should be considered because of continually changing and evolving treatment and management guidelines. (16, 30, 31) The consultant should, in turn, communicate with the primary care service to provide a bridge for new knowledge between the community and melanoma center. The patient, community, and tertiary care center all maximally benefit from this approach. (16)

PROGNOSIS

The most important histologic factors of the primary melanoma lesion are the tumor thickness measured in millimeters (Breslow depth) and the presence or absence of ulceration. (7,31) Microstaging primarily utilizing these factors determines work-up, treatment, and prognosis. Poorer prognosis correlates with deeper Breslow depth and the presence of ulceration. A person with a melanoma detected and treated at an early stage has an excellent prognosis. (7,31, 32) The five-year survival rate ranges from greater than 95% for those diagnosed with a melanoma less than 1.00 mm thick with no ulceration to 30% five-year survival rate for those with a melanoma greater than 4.00 mm thick with ulceration.

The most powerful predictor of overall survival is the status of the regional lymph nodes, independent of Breslow depth. (7,31) Staging of the entire nodal basin can be performed with minimal morbidity by lymphatic mapping and sentinel lymph node biopsy (SLNB) in those patients at intermediate or high risk for lymph node metastasis. SLNB must be performed by a center that routinely performs the procedure for accuracy. SLNB must also be performed at the time of the definitive wide local excision because accuracy significantly decreases if done after a wide local excision. For melanoma approaching 1.0 mm in Breslow depth or <1.0 mm with other adverse features, referral to a melanoma center should be done prior to definitive wide local excision for consideration of SLNB. (33)

PREVENTION

The majority of melanomas are sun-related offering ideal prevention strategies. The easiest way to prevent sunburn is to wear protective clothing including a wide brimmed hat, long sleeves, and pants. Commercially made sun-protective light weight clothing including swimwear are available for summertime use. One should avoid “peak” midday sun usually 10 am-4 pm when the rays are strongest. On exposed skin, use of a broad –spectrum (UVA and UVB) sunscreen is recommended. Sunscreens should be applied 30 minutes before going outdoors and reapplied every 2-3 hours depending on skin type and SPF factor used. Sunscreen should not be used to increase time spent in the sun nor should they be used in place of clothing, hats, and avoidance of “peak” hours sun intensity hours. And finally, evidence suggests UVA tanning lamps may cause skin cancer and melanoma, certainly UVB lamps are causative. The American Academy of Dermatology recommends avoidance of artificial tanning devices for anyone at high risk for melanoma and other skin cancer. Sunglasses should also be worn to prevent cataracts.

THE ROLE OF PRIMARY CARE AND THE PCAPN

PCPs see a significant proportion of the population. Eighty-five percent of the population seeks the care of a PCP every two years. (10) Non-dermatologists examine 70% or more of the population on a regular basis. (9) A routine examination is one of the top ten reasons a patient visits a physician. (10) Many PCPs manage both cancerous and precancerous skin lesions with a very high level of competence. In fact, PCPs are second only to dermatologists in managing these skin lesions. (34)

PCPs, including PCAPNs, have a critical role in the diagnosis, education, and referral of persons with melanoma. (8,9) Population-based screening on an annual basis is recommended by several major organizations such as the NIH Consensus Conference on Early Melanoma, The American Academy of Dermatology and The American Cancer Society. (10,35) Other major organizations such as The American College of Preventive Medicine’s Practice Policy Statements, The Canadian Task Force on the Periodic Health Examination and The US Preventive Services Task Force Guide to Clinical Preventive Services recommend periodic screening of individuals who are at high risk. (35) There are simply not enough dermatologists to routinely screen those who are at risk for developing melanoma. (9) Since PCPs are the first line of contact in the health care system, they need to be able to recognize melanoma, persons at risk for developing melanoma, and educate patients about melanoma. (8,9)

Despite the importance of early melanoma detection and the high level of access primary care providers have to the
population, evidence suggests that clinical processes that may result in early melanoma detection are sometimes not being done.\cite{10,11,12,13} We found no information in the literature regarding how PCAPNs are performing in their role in melanoma detection and education. However, there is information on how PCPs function in melanoma detection and education. This information can be useful in assisting PCAPNs in acknowledging their role in and developing clinical skills for early melanoma detection and education.

In a survey by Geller et al. involving 216 patient diagnosed with melanoma, 87\% of persons reported having a regular physician and 63\% had contact with their physician one year prior to being diagnosed with melanoma.\cite{13} Of those 216, 20\% had received a skin exam in the year prior to diagnosis. Kirsner et al. showed that 31\% of PCPs routinely performed skin cancer screening on all adult patients. Of the primary care physicians who did not routinely screen all of their patients, 31\% did so on high risk patients.\cite{10} Dolan et al. reported that 15\% of physicians performed a skin examination on patients with risk factors.\cite{11} Federman et al. performed a retrospective study of 200 primary care visit medical records in patients with a mean age of 69 and found documentation of skin examinations 28\% of the time, while 10\% had come in with a complaint of a skin lesion.\cite{12} PCPs documented a skin examination less frequently (28\%) than other screening exams such as pap smear (86\%) fecal occult blood testing (60\%), and rectal exam (64\%).

Studies reveal that PCPs desire and need more education and experience in melanoma detection.\cite{8,10,30} Brochez et al. showed groups of dermatologists and PCPs multiple pictures of pigmented skin lesions.\cite{36} One of every two (50\%) lesions was diagnosed correctly by PCPs. When evaluating pictures of early melanomas, one of every three (33\%) was considered benign by PCPs. When pictures of late staged melanomas were evaluated by PCPs, one of every five (20\%) was considered benign.

Stephenson et al. gave PCPs a questionnaire assessing their knowledge of malignant melanoma.\cite{8} Of those surveyed, 28\% identified itching in a lesion as a possible symptom and 25-43\% considered color variegation as a possible sign. Kirsner et al. reported that 70\% of PCPs did not feel comfortable with diagnosing melanoma or squamous cell skin cancer.\cite{10} Stephenson et al. found that 55\% did not feel confident in recognizing melanoma in general and 78.2\% did not feel comfortable in identifying subtle or early signs of melanoma.\cite{8}

Many physicians site lack of confidence in identifying suspicious lesions as a considerable barrier to the detection of melanoma.\cite{10} They also feel that additional training, including clinical experience, is needed. Many physicians desire more information on performing skin examinations, recognizing suspicious nevi, and triaging lesions.\cite{35,9} Brochez et al. demonstrated that physicians with greater exposure to pigmented lesions showed better diagnostic accuracy independent of discipline specialty or subspecialty.\cite{36} They also demonstrated that physicians who were exposed to more educational slides and lectures on melanoma reported improved confidence levels and had improved lesion identification. Roetzheim et al. showed that increasing ratios of dermatologists and family physicians to patient population correlated with earlier detection of melanoma.\cite{37}

Not only is education of health care providers important but public and patient education is vital because over 50\% of melanomas are detected by the patient.\cite{39} Women are more likely to detect thin melanoma than men. Less than 20\% of melanomas are detected by physicians and health care providers. However, melanomas detected by physicians and health care providers are significantly thinner, with a better prognosis and less cost for treatment.\cite{38,40,41}

These studies and findings suggest that PCAPNs can play a vital role in early detection of melanoma and patient education. The majority of lesions are brought to the health care provider’s attention by the patient. Patients need to be taught how to examine their skin and to bring suspicious skin lesions to the attention of their PCAPN. Kriega et al. showed that 40\% of patients did not seek medical attention for a lesion until late signs of melanoma were present (bleeding or ulceration).\cite{42} An educational campaign in Scotland regarding health care practitioner notification of changing nevi resulted in a decrease in melanoma thickness and mortality rate in women.\cite{43} Many melanoma experts feel that patients, particularly those at risk, need to be taught about the risk of sun exposure and the early signs and symptoms of melanoma.\cite{35} Education of PCAPNs can be accomplished through courses, preceptorships, videotapes, and the internet.\cite{44} Once PCAPNs are trained in the basic principles of melanoma recognition, pertinent history for melanoma risk factors, skin examinations, and simple educational prevention measures regarding sun protection, they can easily incorporate them into any visit ranging from acute care to routine health maintenance. The attached appendix provides the PCAPN with guidelines for...
incorporating melanoma detection and education into a clinical visit including initial surveillance, pertinent history, focused skin exam, clinical decision making/triaging, and patient education.

CONCLUSION

The incidence of melanoma is increasing and poses a serious health threat to a significant portion of the population. A good prognosis is dependent on early detection and PCAPNs, particularly in their role of direct clinical care, are in a unique position to detect melanoma in their patients and teach them about early detection and prevention. Though there is no information in the literature regarding the practices of PCAPNs, the information on PCPs suggests a need for increased melanoma awareness and education. The purpose herein was to provide basic information to the PCAPN which may enhance competency in melanoma detection and provide the justification and framework (appendix) for integration of pertinent history, skin examinations, and educational strategies into the context of a clinical care visit.

Given the scarcity of time inherent in clinical practice today, this information may be particularly useful. The screening process is painless and noninvasive. No expensive equipment or additional healthcare personnel are necessary. By prioritizing the critical components of a brief assessment and physical examination (appendix), screening and education can be done efficiently and potentially numerous lives saved.

APPENDIX

PCAPN GUIDELINES FOR EARLY MELANOMA DETECTION

Initial Surveillance

I. Upon the patient entering the exam room, note the following characteristics:

- Skin type (fair skin, freckling)
- Eye and hair color (blue or green eyes, blonde or red hair)
- The presence or absence of excessively tanned or sun damaged skin (wrinkling, lentigies, actinic keratoses)

II. History

- Any skin lesions changing in size, shape, or color, or persistently itching (early signs/symptoms)?
- Any lesions bleeding, tender, or ulcerated (late signs and symptoms)?
- Any history of blistering or peeling sunburns (in childhood, in adulthood, excessive sun exposure, tanning booth/lamp use)?
- Any blood relative ever been diagnosed with melanoma?
- Any personal history of melanoma, non-melanoma skin cancer, or precancerous skin lesions?

III. Physical Examination

- Any lesions should be inspected for the following:
  - Asymmetry
  - Irregular border
  - Variegated or dark color (shades of black, red, white, or blue)
  - Diameter of 6 mm or larger

1. Perform a waist up skin examination on male patients with risk factors
2. Perform a waist up and lower extremity skin examination on female patient who have risk factors
3. For all patients, examine the skin of the back, a common area for melanoma that the patient may not see, for any suspicious lesions, atypical nevi or large number of normal appearing nevi

IV. Clinical Decision Making and Treatment:

- Any suspicious lesion needs to be biopsied or the patient referred to a dermatologist for consultation.
- Persons at high risk for melanoma based on history (risk factors) and limited physical examination should be scheduled to return for a total body skin examination.
- If a diagnosis of melanoma is confirmed, initial referral for consultation to a melanoma center should be considered if available due to rapidly changing treatment guidelines. A comprehensive consultation including a treatment plan and
extensive patient and family education is needed. Referral back to the PCP for surgery is certainly acceptable for thin lesions if the PCP desires and is trained to perform a wide local excisions

V. Patient education:

- Patient education should be directed toward anyone with risk factors for melanoma, should be concise, and should stress the need for follow-up when appropriate.

- Educate the patient to promptly report any lesion which changes in size, shape, or color, or persistently itches for no apparent reason.

- Provide pamphlets with pictures and information on melanoma, or good melanoma websites.

- Provide information on sun avoidance and protection.

- Educate high risk patients on the need for a total body skin examination with a PCP yearly.

- Teach patients to perform a monthly self-total body skin examination along with self-breast and testicular examinations and to call promptly with any changing skin lesions.

**CORRESPONDENCE TO**

Timothy M. Johnson, M.D. University of Michigan Director, Melanoma Clinic 1910 Taubman Center, Box 0314 Ann Arbor, MI 48109-0314 Phone: (734) 936-4190 Fax: (734) 936-6395 Email: timjohn@med.umich.edu

**References**


Early Melanoma Detection: What is the Role of the Advanced Practice Nurse?


Author Information

Denise A. Chinni, R.N., M.S.N.
Department of Dermatology, University of Michigan Health System, Michigan State University

Jennifer L. Schwartz, M.D.
Departments of Dermatology, University of Michigan Health System, Michigan State University

Linda J. Keilman, R.N., C.S., M.S.N.
Department of Nursing, University of Michigan Health System, Michigan State University

Timothy M. Johnson, M.D.
Departments of Dermatology, Surgery (Division of Plastic Surgery), and Nursing, University of Michigan Health System, Michigan State University